

Appendix table 6-63.
Citations to U.S. literature in scientific and technical journals for selected countries, by field: 1990 and 1997
(Percentages of all citations to foreign sources)

Citing country	Citing year	Field											
		All fields	Physics	Chemistry	Earth/space sciences	Mathematics	Biology	Biomedical research	Clinical medicine	Engineering technology	Psychology	Social sciences	Health professional
U.S. percentage of world articles													
U.S. articles as pct. of world's total	1990 ...	38.2	29.8	22.7	41.4	39.9	37.4	38.4	40.2	37.8	61.3	54.7	72.1
	1997 ...	35.3	25.4	21.9	39.0	36.4	32.7	39.1	38.0	33.6	56.5	51.5	66.9
U.S. percentage of countries' citations to foreign articles													
World average	1990 ...	51.5	48.5	40.3	52.9	50.2	42.1	56.6	52.0	48.5	66.1	65.8	71.3
	1997 ...	46.9	38.9	36.1	49.5	46.5	37.4	54.7	47.9	39.9	58.3	61.9	64.5
Japan	1990 ...	58.9	58.0	51.1	59.2	55.2	44.5	63.9	58.0	56.5	69.4	69.4	67.3
	1997 ...	54.6	46.8	44.7	58.3	48.7	46.9	62.1	54.2	45.8	56.5	69.8	64.2
United Kingdom	1990 ...	54.3	50.5	38.4	57.0	57.6	41.5	59.7	55.3	50.8	66.2	68.1	75.4
	1997 ...	50.0	40.3	37.3	53.8	52.5	36.7	57.6	49.9	40.8	58.8	66.1	67.8
Germany	1990 ...	51.8	50.3	42.2	53.5	49.7	38.6	56.2	52.3	47.0	66.7	66.4	63.2
	1997 ...	48.7	41.8	40.9	50.8	48.1	37.3	56.0	49.0	37.1	58.2	55.2	54.4
France	1990 ...	52.7	49.9	41.0	55.9	50.8	38.6	57.8	53.2	49.4	58.8	64.1	72.1
	1997 ...	47.2	38.2	36.0	50.5	47.7	37.9	54.7	48.1	38.2	49.8	57.4	60.6
Canada	1990 ...	59.0	49.2	48.1	59.6	53.4	56.3	60.9	59.1	56.2	77.5	76.4	84.5
	1997 ...	55.3	43.9	42.0	55.4	55.1	49.9	59.7	55.3	47.4	70.8	71.7	78.2
Russia	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	39.0	35.2	33.4	47.4	39.4	33.6	49.2	42.9	34.5	49.1	66.7	69.2
Italy	1990 ...	48.7	42.9	37.5	49.8	46.9	38.4	54.5	50.7	45.0	59.0	53.9	53.2
	1997 ...	45.4	36.6	33.6	49.8	44.4	36.2	53.6	46.3	44.2	51.3	58.9	58.0
Australia	1990 ...	51.7	44.8	41.0	54.1	50.3	48.5	54.8	51.3	48.4	65.6	60.5	66.6
	1997 ...	47.4	39.1	35.4	49.6	40.3	40.5	52.8	47.4	38.5	58.3	58.3	63.2
Netherlands	1990 ...	49.5	46.4	41.2	45.9	46.3	38.1	53.9	49.8	46.0	59.7	59.6	63.9
	1997 ...	46.1	39.9	36.0	46.9	45.3	33.8	50.7	46.4	41.0	63.0	60.0	60.4
Sweden	1990 ...	48.7	44.9	36.6	48.3	44.4	41.1	53.5	48.1	45.8	52.4	69.3	63.6
	1997 ...	44.9	33.4	39.6	44.8	41.1	35.0	51.9	44.8	36.9	44.1	54.4	53.6
Denmark	1990 ...	45.1	43.5	40.2	51.6	40.0	34.7	49.0	43.8	43.4	49.1	49.2	84.6
	1997 ...	41.2	34.7	37.4	46.3	48.4	31.7	47.7	39.8	42.6	34.2	52.0	59.4
Finland	1990 ...	48.3	42.7	35.3	35.2	37.5	35.5	55.6	48.2	50.0	53.4	54.2	64.8
	1997 ...	44.6	36.9	32.6	43.5	53.2	32.2	52.4	44.7	37.1	50.4	55.6	55.2
Norway	1990 ...	47.2	43.8	34.1	41.2	57.4	32.8	53.6	47.7	48.0	55.4	51.7	52.9
	1997 ...	40.4	34.0	30.3	35.7	51.8	28.4	47.1	40.8	43.4	42.9	53.7	47.1
Switzerland	1990 ...	51.5	47.6	37.5	52.1	41.4	43.6	58.0	50.4	48.8	53.5	65.8	70.2
	1997 ...	47.2	39.5	34.2	45.9	44.8	39.0	55.4	47.4	32.3	44.4	57.5	64.5
Belgium	1990 ...	47.2	38.8	40.4	43.8	46.0	36.6	50.0	48.8	51.6	54.5	59.0	62.3
	1997 ...	42.4	32.1	31.9	39.2	46.5	32.7	46.8	44.8	44.4	48.2	47.8	50.4
Austria	1990 ...	47.4	43.7	35.2	40.1	43.2	31.5	52.7	47.8	47.5	37.3	48.1	100.0
	1997 ...	43.6	36.3	31.9	34.2	39.4	35.9	51.0	44.1	30.3	45.1	62.2	41.2
Ireland	1990 ...	39.5	41.6	31.1	30.4	54.2	33.7	44.5	40.0	25.8	68.8	65.2	54.5
	1997 ...	38.2	34.8	26.4	43.1	22.2	26.6	42.9	40.4	31.7	62.2	46.2	63.6
Spain	1990 ...	44.9	44.4	33.9	46.5	41.0	38.2	48.7	48.8	44.0	57.1	72.7	51.0
	1997 ...	41.1	34.3	31.0	42.8	42.4	33.0	49.2	45.1	36.0	51.8	60.7	61.5

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 6-63.
Citations to U.S. literature in scientific and technical journals for selected countries, by field: 1990 and 1997
(Percentages of all citations to foreign sources)

Citing country	Citing year	Field											
		All fields	Physics	Chemistry	Earth/space sciences	Mathematics	Biology	Biomedical research	Clinical medicine	Engineering technology	Psychology	Social sciences	Health professional
U.S. percentage of world articles													
U.S. articles as pct. of world's total	1990	38.2	29.8	22.7	41.4	39.9	37.4	38.4	40.2	37.8	61.3	54.7	72.1
	1997	35.3	25.4	21.9	39.0	36.4	32.7	39.1	38.0	33.6	56.5	51.5	66.9
U.S. percentage of countries' citations to foreign articles													
Greece	1990	43.7	43.3	35.9	39.8	51.3	33.9	50.0	46.0	44.4	44.4	51.9	77.8
	1997	39.6	32.3	32.6	41.8	36.7	30.4	50.2	42.2	45.0	55.6	56.2	33.3
Turkey	1990	45.7	46.7	29.4	42.1	55.6	47.1	42.6	51.9	43.2	63.3	58.8	66.7
	1997	36.1	29.7	24.3	31.5	50.0	32.3	39.9	39.8	39.7	60.0	55.9	68.0
Portugal	1990	36.0	35.8	29.9	46.8	42.1	29.1	37.6	34.9	50.0	66.7	71.4	50.0
	1997	34.5	35.1	29.9	40.8	22.2	22.0	39.3	36.8	31.7	42.9	43.8	50.0
Yugoslavia	1990	42.9	41.7	34.7	48.0	62.5	45.2	45.8	46.0	38.3	64.7	22.2	18.2
	1997	38.5	36.0	33.3	37.5	50.0	40.0	47.3	38.1	43.0	46.7	NA	100.0
Croatia	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997	36.8	34.0	35.2	31.6	63.6	21.4	37.1	38.2	26.9	72.7	100.0	46.2
Slovenia	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997	35.1	32.6	37.7	44.2	42.9	31.8	29.4	39.0	35.0	80.0	0.0	37.5
Poland	1990	38.7	38.4	31.1	48.1	42.9	30.6	43.4	42.1	37.2	55.0	72.7	40.0
	1997	33.4	28.1	27.3	37.4	43.8	27.6	42.7	41.4	30.4	38.2	66.7	75.0
Czechoslovakia	1990	38.9	39.8	32.7	37.0	45.0	28.8	41.4	44.4	34.9	57.1	66.7	33.3
	1997	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Czech Republic	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997	33.4	24.7	25.7	38.6	22.5	25.8	41.1	39.8	21.5	22.4	53.6	100.0
Slovakia	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997	30.9	25.2	24.9	26.7	43.8	26.8	33.2	39.1	33.3	46.7	50.0	NA
Hungary	1990	42.1	38.8	30.4	38.9	42.3	33.3	49.2	46.7	36.1	33.3	60.0	40.0
	1997	38.6	34.2	30.3	33.6	53.8	30.7	47.0	41.7	36.6	35.5	50.0	66.7
Bulgaria	1990	34.0	36.4	22.4	39.6	44.4	36.2	39.6	38.4	19.2	100.0	0.0	0.0
	1997	31.9	33.8	24.4	35.5	47.1	17.9	42.5	34.0	19.0	16.7	14.3	50.0
Romania	1990	37.0	41.5	27.9	33.3	23.8	30.0	45.7	37.8	25.0	NA	NA	0.0
	1997	30.0	28.4	23.8	34.5	35.0	33.3	47.9	32.5	27.4	NA	50.0	NA
India	1990	43.6	46.6	35.8	50.7	58.8	35.6	48.1	45.3	36.5	68.9	51.3	36.8
	1997	41.1	39.2	33.9	52.3	42.0	32.0	49.1	45.5	37.4	43.3	59.0	63.4
China	1990	47.0	48.2	38.7	50.8	50.0	43.5	53.6	45.9	47.6	53.8	75.0	40.0
	1997	40.4	39.4	34.3	48.4	36.2	31.4	52.6	46.3	37.8	55.6	60.9	42.0
Taiwan	1990	51.6	50.0	43.4	42.4	77.4	47.1	60.2	49.2	56.4	65.0	78.9	50.0
	1997	46.6	47.0	40.5	55.3	59.7	44.9	50.7	44.8	46.3	66.7	67.2	57.4
South Korea	1990	52.2	53.3	48.3	47.9	58.1	41.4	53.6	57.3	49.5	75.0	92.3	88.9
	1997	46.9	44.6	41.7	53.4	57.5	46.9	54.7	46.0	45.4	83.3	52.3	69.7
Hong Kong	1990	42.4	56.9	40.9	46.9	41.7	33.8	45.5	39.5	43.8	61.0	65.2	54.5
	1997	40.4	39.6	32.9	49.0	48.0	33.2	47.1	38.9	40.8	67.9	64.5	67.9
Singapore	1990	40.3	34.6	45.4	36.4	40.0	40.5	46.0	34.2	40.6	66.7	42.9	80.0
	1997	42.6	35.8	35.5	21.7	60.0	33.6	49.5	44.4	39.0	73.3	53.7	72.7

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 6-63.
Citations to U.S. literature in scientific and technical journals for selected countries, by field: 1990 and 1997
(Percentages of all citations to foreign sources)

Citing country	Citing year	Field											
		All fields	Physics	Chemistry	Earth/space sciences	Mathematics	Biology	Biomedical research	Clinical medicine	Engineering technology	Psychology	Social sciences	Health professional
U.S. percentage of world articles													
U.S. articles as pct. of world's total	1990 ...	38.2	29.8	22.7	41.4	39.9	37.4	38.4	40.2	37.8	61.3	54.7	72.1
	1997 ...	35.3	25.4	21.9	39.0	36.4	32.7	39.1	38.0	33.6	56.5	51.5	66.9
U.S. percentage of countries' citations to foreign articles													
Thailand	1990 ...	44.6	48.0	54.8	50.0	100.0	39.1	43.2	38.5	36.4	NA	53.8	45.5
	1997 ...	37.4	38.8	26.2	48.1	NA	31.4	39.7	38.4	27.6	66.7	80.0	55.6
Malaysia	1990 ...	39.4	28.0	32.8	14.3	20.0	36.8	47.1	43.2	27.3	NA	80.0	50.0
	1997 ...	27.0	20.0	20.8	40.0	NA	23.6	33.8	26.6	17.4	50.0	100.0	33.3
Pakistan	1990 ...	31.5	36.1	15.6	18.5	0.0	34.0	37.5	31.9	16.7	NA	66.7	66.7
	1997 ...	31.9	28.6	12.0	40.0	0.0	38.5	38.3	36.6	37.5	100.0	60.0	42.9
Philippines	1990 ...	38.5	50.0	0.0	68.8	NA	28.6	33.3	45.3	NA	100.0	87.5	100.0
	1997 ...	42.6	50.0	75.0	40.0	NA	33.8	52.4	41.5	100.0	50.0	50.0	0.0
Bangladesh	1990 ...	39.2	37.5	20.0	33.3	NA	8.3	46.7	52.8	0.0	0.0	60.0	NA
	1997 ...	36.4	30.9	30.0	44.4	100.0	13.3	43.9	39.0	40.0	NA	44.4	50.0
New Zealand	1990 ...	43.9	45.3	36.8	43.1	65.0	37.5	48.6	43.3	42.9	67.5	38.8	61.5
	1997 ...	44.3	40.4	29.9	44.6	39.5	41.1	47.8	43.7	43.6	62.0	55.1	63.7
USSR	1990 ...	45.1	45.4	34.3	52.6	47.7	36.3	48.9	46.6	37.1	54.3	41.2	56.3
	1997 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ukraine	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	32.0	32.4	22.4	34.1	35.0	31.0	42.3	36.5	24.3	0.0	NA	100.0
Belarus	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	32.2	30.4	26.5	40.9	50.0	26.5	45.9	40.3	20.4	NA	NA	0.0
Uzbekistan	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	27.2	19.8	11.8	57.1	0.0	66.7	29.8	46.2	0.0	NA	NA	NA
Estonia	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	30.8	25.1	22.5	22.0	33.3	26.0	42.8	31.5	36.0	46.2	100.0	33.3
Latvia	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	30.3	22.5	21.8	12.5	100.0	50.0	40.0	42.9	43.8	0.0	NA	NA
Lithuania	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	29.3	26.7	21.3	47.1	66.7	0.0	34.4	36.2	25.0	NA	NA	0.0
Armenia	1990 ...	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1997 ...	36.1	33.1	50.0	50.0	NA	NA	36.8	37.0	50.0	NA	NA	NA
Brazil	1990 ...	48.0	42.7	37.0	51.1	62.2	48.3	49.6	51.1	44.3	51.9	76.9	53.3
	1997 ...	40.7	34.7	26.4	47.2	47.8	36.5	48.1	44.3	36.7	53.2	79.5	52.4
Argentina	1990 ...	47.8	45.2	31.7	47.5	60.0	44.1	51.3	53.8	47.2	66.7	68.8	NA
	1997 ...	42.5	40.4	26.9	49.0	37.1	38.8	48.5	44.7	38.8	54.1	16.7	0.0
Mexico	1990 ...	51.2	47.8	41.7	54.8	29.6	50.3	49.5	53.9	56.6	79.1	60.0	85.7
	1997 ...	42.2	33.2	28.8	51.1	34.8	42.2	44.9	48.4	32.6	64.6	80.0	56.3
Chile	1990 ...	50.9	49.6	23.0	55.6	46.2	47.0	53.5	53.9	42.1	0.0	71.4	62.5
	1997 ...	43.8	33.3	26.6	48.7	52.6	41.8	47.6	45.5	32.7	60.0	83.3	65.2
Venezuela	1990 ...	48.9	45.8	42.7	62.0	20.0	46.8	47.1	53.8	50.0	37.5	40.0	20.0
	1997 ...	39.8	34.1	30.5	47.8	53.8	43.9	41.7	45.9	19.0	37.5	50.0	50.0

See explanatory notes, if any, and SOURCE at end of table.

Appendix table 6-63.
Citations to U.S. literature in scientific and technical journals for selected countries, by field: 1990 and 1997
(Percentages of all citations to foreign sources)

Citing country	Citing year	Field											
		All fields	Physics	Chemistry	Earth/space sciences	Mathematics	Biology	Biomedical research	Clinical medicine	Engineering technology	Psychology	Social sciences	Health professional
U.S. articles as pct. of world's total		1990 ...	29.8	22.7	41.4	39.9	37.4	38.4	40.2	37.8	61.3	54.7	72.1
		1997 ...	25.4	21.9	39.0	36.4	32.7	39.1	38.0	33.6	56.5	51.5	66.9
U.S. percentage of world articles													
Colombia		1990 ...	29.2	42.9	56.3	100.0	29.5	45.5	44.6	38.5	50.0	80.0	50.0
		1997 ...	28.2	28.9	51.2	33.3	39.6	39.5	40.9	66.7	66.7	70.0	83.3
Cuba		1990 ...	32.9	33.3	0.0	0.0	30.0	41.2	44.4	33.3	NA	NA	0.0
		1997 ...	28.6	22.9	50.0	NA	35.3	38.5	44.3	20.0	57.1	0.0	NA
Israel		1990 ...	61.1	48.6	61.3	61.0	49.3	59.8	58.5	63.6	74.3	73.7	78.2
		1997 ...	44.8	40.6	61.0	59.2	41.5	58.6	52.4	50.5	67.3	74.3	70.3
Saudi Arabia		1990 ...	37.8	42.4	32.4	16.7	22.9	47.7	49.1	43.1	NA	66.7	83.3
		1997 ...	32.7	24.3	38.5	33.3	20.0	44.0	41.5	35.5	0.0	0.0	53.8
Iran		1990 ...	80.0	46.2	60.0	0.0	60.0	27.3	29.7	33.3	100.0	100.0	0.0
		1997 ...	35.2	23.0	15.8	0.0	38.9	43.8	36.1	18.2	100.0	100.0	50.0
Jordan		1990 ...	12.2	40.7	20.0	NA	61.1	42.2	36.5	43.5	33.3	50.0	100.0
		1997 ...	30.2	26.2	25.0	0.0	28.6	31.8	47.7	50.0	100.0	33.3	50.0
Kuwait		1990 ...	50.0	43.9	83.3	100.0	19.1	56.3	40.9	48.7	50.0	100.0	71.4
		1997 ...	36.8	13.8	54.5	50.0	32.4	42.9	38.5	31.0	40.0	50.0	100.0
South Africa		1990 ...	44.6	32.5	48.3	52.0	38.5	49.8	45.1	43.9	61.5	51.6	57.4
		1997 ...	26.7	26.6	39.2	62.5	33.4	45.0	42.9	43.5	66.0	37.7	50.0
Egypt		1990 ...	41.0	19.8	35.1	0.0	35.4	45.1	44.3	36.5	66.7	100.0	66.7
		1997 ...	26.2	19.8	28.6	66.7	29.4	35.4	38.1	22.4	50.0	50.0	52.6
Nigeria		1990 ...	27.3	26.3	37.5	100.0	30.5	29.5	36.7	29.4	0.0	68.8	73.1
		1997 ...	25.0	15.0	20.8	0.0	34.5	33.3	37.1	50.0	50.0	40.0	75.0
Kenya		1990 ...	0.0	30.0	20.0	NA	31.0	48.2	43.1	NA	100.0	58.3	100.0
		1997 ...	34.8	0.0	47.1	100.0	28.1	35.7	33.1	100.0	50.0	66.7	50.0
Morocco		1990 ...	29.2	29.3	25.0	25.0	34.8	33.3	33.3	30.0	NA	NA	NA
		1997 ...	22.7	21.1	31.6	25.0	29.7	31.7	34.1	11.4	0.0	NA	NA
Algeria		1990 ...	28.6	21.1	10.0	50.0	28.6	35.3	35.0	22.2	0.0	NA	NA
		1997 ...	21.7	20.0	0.0	0.0	40.0	30.0	25.0	25.0	NA	NA	0.0
Tunisia		1990 ...	40.9	23.9	25.0	0.0	50.0	43.2	33.3	NA	100.0	NA	NA
		1997 ...	18.8	11.4	17.6	20.0	23.7	35.5	27.5	38.1	NA	100.0	75.0

NA = not appropriate: either no citations or not in existence in year indicated

NOTE: Citations are to three years' articles with two-year lag; for example, 1997 citation counts are to articles published in 1993-95.

SOURCE: Institute for Scientific Information, Science Citation and Social Science Citation Indexes; CHl Research, Inc., Science Indicators database; and National Science Foundation, Division of Science Resources Studies (NSF/SRS), special tabulation.

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